AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS:

1. (currently amended) A method of at least detecting defects, if any, of at least one rotor (6, 10) of a first rotary wing aircraft ~~(1) of a particular type of rotary wing aircraft~~, a defect corresponding to a defective state of a part of the rotor (6, 10), wherein

~~characterized in that~~:

I - in a preliminary step, ~~in which~~ using a second reference aircraft ~~is used~~ of a type corresponding to [[a]] the first rotary wing aircraft ~~(1) of said particular type~~, and having its rotor (6, 10) without defect and adjusted to a reference setting for which the vibration level of at least one portion (3, 8) of said reference aircraft [[(1)]] is at a minimum, the following operations are performed:

a) taking at least a first series of measurements on said reference aircraft [[(1),]] by measuring, during particular operation of said reference aircraft, the values of at least two accelerations which are measured at arbitrary locations of said portion (3, 8) of the reference aircraft and which are representative of the vibration generated at said portion (3, 8) of the reference aircraft:

[[α]] i) firstly using the rotor (6, 10) of the reference aircraft [[(1)]] which is without defect and which is adjusted on said reference setting; and

[[β]] ii) secondly by introducing defects into said rotor (6, 10); and

b) on the basis of said first series of acceleration measurements and assuming that the reference aircraft [[(1)]] is a deformable body, determining a neural network that illustrates the relationships between said accelerations and at least said introduced defects in the reference aircraft; and

II - in a later step, for at least ~~defecting~~ detecting any defects of the rotor (6, 10) of ~~a particular~~ the first rotary wing aircraft ~~(1) of said aircraft type~~, the following operations are performed on the first rotary wing aircraft:

a) taking a second series of measurements are taken on said ~~particular~~ first rotary wing aircraft [[(1)]] by measuring the values of at least some of said accelerations at said portion (3, 8) of the first rotary wing aircraft during particular operation of said first rotary wing aircraft; and

b) on the basis of said second series of acceleration measurements and on the basis of the neural network determined in step I/b), detecting any defects of said rotor (6, 8) in the first rotary wing aircraft.

2. (currently amended) A method according to claim 1, ~~for also adjusting at least one rotor (6, 10) of a rotary wing aircraft (1) of said particular type of rotary wing aircraft, characterized in that:~~

~~I -~~ further comprising, in the preliminary step, ~~the following operations are performed:~~

a) taking said first series of measurements on said reference aircraft [[(1)]] in a situation [[γ]] iii) in addition to said situations [[α]] i) and [[β]] ii), by measuring, during the particular operation of said reference aircraft, the values of said accelerations which are representative of vibration generated at said portion (3, 8) of the reference aircraft, and varying the adjustment values of a plurality of adjustment parameters of said rotor (6, 10) in said situation [[γ]] iii); and

b) on the basis of said first series of acceleration measurements, determining said neural network which illustrates the relationships between firstly said accelerations and secondly said defects and said adjustment parameters; and

[[II -]] in the later step, ~~which is additionally for adjusting the rotor (6, 10) of the particular rotary wing aircraft (1) of said type of aircraft, after said operations a) and b), the following operations are performed:~~

c) on the basis of said second series of acceleration measurements and of the neural network determined in step I/b),

determining the adjustment values of at least some of said adjustment parameters which enable the level of vibration of said portion (3, 8) of the first rotary wing aircraft [[(1)]] to be minimized; and

d) applying to the rotor (6, 10) of said first rotary wing aircraft [[(1)]] the adjustment values as determined in this way for said adjustment parameters.

3. (original) A method according to claim 2, characterized, between steps II/b) and II/c), by eliminating any defects that have been detected in said step II/b), and by taking a new, second series of measurements for use in step II/c) for determining the adjustment parameters.

4. (currently amended) A method according to claim 2, characterized in that the adjustment elements defining said adjustment parameters comprise at least the following elements (25, 27, 28) of the rotor (6) of the reference aircraft:

· at least one balance weight (25) for each of the blades (7) of the rotor (6);

· a pitch-link (27) on each of the blades (7) of the rotor (6), except for one blade which represents a reference blade; and

· at least one compensating tab (28) on the trailing edge (29) of each of the blades (7) of the rotor (6).

5. (currently amended) A method according to claim 2, characterized in that for an advance and lift rotor (6) of ~~a~~

~~rotary wing~~ the reference aircraft [[(1)]], in said step I/a), said first series of measurements are taken during at least one of the following test flights:

· a reference flight with the rotor (6) adjusted in accordance with said reference setting;

· flights with defects of the rotor (6);

· a flight with a particular ~~mis-adjustment~~ misadjustment of at least one balance weight (25) of a blade (7);

· a flight with a particular ~~mis-adjustment~~ misadjustment of at least one pitch-link (27) of a blade (7); and

· a flight with a particular ~~mis-adjustment~~ misadjustment of at least one compensating tab (28) provided on the trailing edge (29) of a blade (7).

6. (original) A method according to claim 5, characterized in that at least one of said test flights during step I/a) and of said measurement flights during step II/a) includes the following configurations, during which measurements are taken:

· a stationary flight configuration;

· a configuration of flight at about 50 m/s;

· a configuration of flight at continuous maximum power; and

· a test on the ground with the rotor (6) revolving.

7. (currently amended) A method according to claim 1, characterized in that for an advance and lift rotor (6) of ~~a~~

~~rotary wing~~ the reference aircraft [[(1)]], said portion of the reference aircraft where the values of said accelerations are measured is the cabin (3) of the reference aircraft [[(1)]].

8. (currently amended) A method according to claim 1, characterized in that for an anti-torque tail rotor (10) of ~~a rotary wing~~ the reference aircraft [[(1)]], said portion of the reference aircraft at which the values of said accelerations are measured is the tail boom (8) of the reference aircraft [[(1)]].

9. (currently amended) A method according to claim 1, characterized in that for an anti-torque tail rotor (10) of ~~a rotary wing~~ the reference aircraft [[(1)]] and the first rotary wing aircraft, at least one of said first and second series of measurements is taken with the aircraft [[(1)]] on the ground and the tail rotor (10) in operation.

10. (currently amended) A method according to claim 2, characterized in that during step I/b), account is taken of the following additional assumptions for determining said neural network:

· the rotor (6, 10) is not isotropic;

· the relationships between firstly the defects and the adjustment parameters and secondly the acceleration values are non-linear; and

· the vibration level existing at any particular point of the reference aircraft [[(1)]] corresponds to the sum of the elementary vibrations generated at said particular point and

caused by the defects and the ~~mis-adjustment~~ misadjustment of said adjustment parameters.

11. (previously presented) A method according to claim 1, characterized in that during step II/b), the defects that are detected are displayed.

12. (previously presented) A method according to claim 1, characterized in that during step II/b), the defects that are detected are recorded.

13. (previously presented) A method according to claim 2, characterized in that during step II/c), the adjustment value α of an adjustment parameter is determined by minimizing the following expression:

$$\|R(\alpha)+\gamma\|^2$$

in which:

· R is the corresponding transfer function of said neural network; and

· γ is a vector containing the vibration level representative of the measurements taken in step II/a).

14. (previously presented) A method according to claim 2, characterized in that during step II/c), the adjustment values that have been determined are displayed.

15. (previously presented) A method according to claim 2, characterized in that during step II/c), the adjustment values that have been determined are recorded.

16. (currently amended) A method according to claim 2, characterized in that a resetting stage is performed <u>following the later step and</u> during which the following operations are performed:

a) taking a third series of measurements while causing the adjustment values of only some of said adjustment parameters to vary; and

b) adjusting said neural network on the basis of said third series of measurements, for the corresponding relationships which relate to the adjustment parameters for which the adjustment values have been varied.

17-19. (canceled)

20. (new)) A method of detecting defects in a rotor of a first rotary wing aircraft, the method comprising the steps of:

providing a second reference aircraft of a type corresponding to the first rotary wing aircraft, the reference aircraft having a rotor without defects and being adjusted to a reference setting for which a vibration of a portion of the reference aircraft is at a minimum;

taking a first series of measurements on the reference aircraft by measuring plural accelerations at the portion of the reference aircraft which are representative of the vibration at the portion of the reference aircraft, the first series of measurements being taken before and after introducing defects into the rotor of the reference aircraft;

on the basis of the first series of measurements and assuming that the reference aircraft is a deformable body, determining a neural network that illustrates relationships between the plural accelerations and the defects introduced in the rotor of the reference aircraft;

taking a second series of measurements on the first rotary wing aircraft by measuring accelerations at a portion of the first rotary wing aircraft corresponding to the portion of the reference aircraft; and

on the basis of the second series of measurements and the neural network, detecting defects in the rotor of the first rotary wing aircraft.